

REMARKS

Applicants gratefully acknowledge the allowance of claims 3-5, 7 and 8. Claims 1-2 and 12-17 have been amended. Claim 6 has been canceled. New claim 26 has been added. Claims 1-8 and 12-17 remain pending in the application.

Claim 17 is objected to under 37 CFR 1.75(c) as being in improper form because a multiple dependent claim cannot depend on another multiple dependent claim. Claim 17 has been amended to remove multiple dependency on another multiple dependent claim. Applicants request the objection be withdrawn.

Claims 6 and 7 stand rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter regarded as the invention. Claim 6 has been canceled. Claim 7 recites “a strain element having a height lower than the height of the metal coil is formed on an outer circumferential surface of the metal coil along an opposite end portion of that of the inner circumferential surface.” Claim 7 clearly describes strain elements formed on the outer circumferential surface at an opposite end from strain elements formed on the inner circumferential surface. The language is clear and unambiguous. Accordingly, Applicants respectfully request withdrawal of the rejection of claim 7.

Claims 1, 6, 12, 14 and 16 stand rejected under 35 U.S.C. § 102(a) as being anticipated by Hooley et al. (WO 01/47318). Hooley describes a loudspeaker which uses an electro-active device. Claim 6 has been canceled. Amended claim 1 recites “the strain element is wound like a coil, and electrodes are formed on an inner circumferential surface and an outer circumferential surface, wherein said electrodes have a width narrower than said strain element.” Hooley does not disclose this limitation where “said electrodes have a width narrower than said strain element,” as recited in claim 1.

Amended claim 12 recites “both end portions of the strain element are spirally wound wherein a portion between said spirally wound ends is not spirally wound.” Hooley does not disclose this limitation. Hooley only discloses electro-active devices for loud

speakers in a spiral shape, Hooley does not disclose any electro-active devices having “both end portions of the strain element are spirally wound wherein a portion between said spirally wound ends is not spirally wound,” as recited in claim 12.

Claims 14 and 16 recite “a capacitor formed from said dielectric material in a parallel electrical connection with the strain element.” Hooley discloses “external material of, say, a polymeric or elastomeric material may be applied to act as a protective and/or shock absorbing layer to prevent damage” (Hooley, page 12). External application of polymeric or elastomeric material as a protective layer as disclosed by Hooley is not the same limitation as dielectric material forming a capacitor in a parallel electrical connection with the strain element as recited in claims 14 and 16.

For at least the reasons stated above, claims 1, 12, 14 and 16 should be allowed.

Claims 1, 6 and 12 stand rejected under 35 U.S.C. § 102(b) as being anticipated by Radice (U.S. Pat. No. 4,638,207). Radice describes a balloon structure with a polymer film adhered to it. Claim 6 has been canceled. Claim 1 recites “the strain element is wound like a coil, and electrodes are formed on an inner circumferential surface and an outer circumferential surface, wherein said electrodes have a width narrower than said strain element.” Radice does not disclose the limitation of claim 1 wherein “said electrodes have a width narrower than said strain element.”

Claim 12 recites “both end portions of the strain element are spirally wound wherein a portion between said spirally wound ends is not spirally wound.” Radice shows a polymer tape wrapped around, and taking the shape of, a balloon. Radice does not teach or suggest a strain element having “both end portions of the strain element are spirally wound wherein a portion between said spirally wound ends is not spirally wound.” For at least the reasons stated above, claim 12, should be allowed.

Claims 1, 2, 6, 12 and 13 stand rejected under 35 U.S.C. § 102(b) as being anticipated by Kolm et al. (U.S. Pat. No. 4,435,667). Kolm describes a rotary actuator mounted in a support plate. Claim 6 has been canceled. Claim 1 recites “the strain

element is wound like a coil, and electrodes are formed on an inner circumferential surface and an outer circumferential surface, wherein said electrodes have a width narrower than said strain element.” Kolm does not disclose the limitation of claim 1 wherein “said electrodes have a width narrower than said strain element.”

Amended claim 2 recites “a strain element having a width narrower than the width of the metal coil is formed on at least one of an inner circumferential surface and an outer circumferential surface of the metal coil.” Kolm does not disclose the limitation of a strain element having “a width narrower than the width of the metal coil” as recited in claim 2 of the Application.

Claims 12 and 13 recite “both end portions of the strain element are spirally wound wherein a portion between said spirally wound ends is not spirally wound.” Kolm does not disclose this limitation.

For at least the reasons stated above, claims 1, 2, 12 and 13 should be allowed.

Claims 1, 2, 6, 12 and 13 stand rejected under 35 U.S.C. §102(b) as being anticipated by Hyodo et al. (JP6-22396). Claim 1 recites “the strain element is wound like a coil, and electrodes are formed on an inner circumferential surface and an outer circumferential surface, wherein said electrodes have a width narrower than said strain element.” Hyodo does not disclose the limitation of claim 1 wherein “said electrodes have a width narrower than said strain element.”

Claim 2 recites “a strain element having a width narrower than the width of the metal coil is formed on at least one of an inner circumferential surface and an outer circumferential surface of the metal coil.” Hyodo does not disclose the limitation of a strain element “having a width narrower than the width of the metal coil.”

Claims 12 and 13 recite “both end portions of the strain element are spirally wound wherein a portion between said spirally wound ends is not spirally wound.” Hyodo does not disclose this limitation. For at least this reason, claims 12 and 13 should be

allowed.

Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kolm et al. in view of Hooley. Hooley describes a loudspeaker which uses an electro-active device. Kolm describes a rotary actuator. As stated above, Hooley discloses polymeric or elastomeric material as a protective layer which encloses the external surfaces of an electro-active device. The cited references, whether taken alone or in combination fail to teach or suggest the limitations of claim 15 of the present application.

Claim 15 recites “the actuator includes a spirally wound metal coil” and “a capacitor formed from said dielectric material in a parallel electrical connection with the strain element.”

The subject matter of claim 15 would not have been obvious over Kolm and Hooley, whether considered alone or in combination. First, neither Kolm or Hooley teaches or suggests the limitations of claim 15. Kolm does not disclose “a capacitor formed from said dielectric material in a parallel electrical connection with the strain element” as recited in claim 15 of the application. Hooley does not disclose “the actuator includes a spirally wound metal coil” as recited in claim 15 of the application.

Second, a person skilled in the art would not have been motivated to combine the teachings of Kolm with those of Hooley to arrive at the claimed invention. There is no motivation to combine the dissimilar teachings of Kolm related to a rotary actuator on a support mount with the teachings of Hooley related to a loudspeaker which uses an electro-active device. Accordingly, one skilled in the art would not have been motivated to combine these disparate references, and withdrawal of the rejection of claim 15 is respectfully requested.

Attached hereto is a marked-up version of the changes made to the specification and claims by the current amendment. The attached page is captioned “Version with markings to show changes made.”

In view of the above, each of the presently pending claims in this application is believed to be in immediate condition for allowance. Accordingly, the Examiner is respectfully requested to withdraw the outstanding rejection of the claims and to pass this application to issue.

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Respectfully submitted,

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Version With Markings to Show Changes Made

1. (Amended) An actuator provided with a strain element having a property of a piezoelectric inverse effect, wherein:

the strain element is wound like a coil, and electrodes are formed on an inner circumferential surface and an outer circumferential surface, wherein said electrodes have a width narrower than said strain element.

2. (Amended) An actuator provided with a strain element having a property of a piezoelectric inverse effect, wherein:

the actuator includes a metal coil wound like a coil;

the strain element having a width narrower than the width of the metal coil is formed on at least one of an inner circumferential surface and an outer circumferential surface of the metal coil; and

an electrode is formed on a surface of the strain element.

12. (Amended) An actuator provided with a strain element having a property of a piezoelectric inverse effect, wherein:

both end portions of the strain element are spirally wound wherein a portion between said spirally wound ends is not spirally wound; and

electrodes are formed on an inner circumferential surface and an outer circumferential surface of the strain element.

13. (Amended) An actuator provided with a strain element having a property of a piezoelectric inverse effect, wherein:

the actuator includes a metal coil having both ends spirally wound wherein a portion between said spirally wound ends is not spirally wound;

the strain element is formed on at least one of an inner circumferential surface and an outer circumferential surface of the metal coil; and

an electrode is formed on a surface of the strain element.

14. (Amended) An actuator provided with a strain element having a property of a piezoelectric inverse effect, wherein:

the strain element is spirally wound, said strain element being formed of a dielectric material;

electrodes are formed on an inner circumferential surface and an outer circumferential surface of the strain element; and

[a dielectric is provided] a capacitor formed from said dielectric material in a parallel electrical connection with the strain element.

15. (Amended) An actuator provided with a strain element having a property of a piezoelectric inverse effect, wherein:

the actuator includes a spirally wound metal coil;

the strain element is formed on at least one of an inner circumferential surface and an outer circumferential surface of the metal coil, said strain element being formed of a dielectric material;

an electrode is formed on a surface of the strain element; and

[a dielectric is provided] a capacitor formed from said dielectric material in a parallel electrical connection with the strain element.

16. (Amended) An actuator according to any one of claims 1 to 13, further comprising a dielectric acting as a capacitor in parallel with the strain element.

17. (Amended) An actuator according to any one of claims 1 to [16] 15, wherein the strain element is a laminated strain element.